REMARKS

Claims 4-7 are currently pending. Claims 4 and 6 are in independent form.

The present invention is directed to a work-hardened stainless steel sheet characterized by its chemical composition and metallurgical structure, which can be formed to a particular configuration without cracking, even under severe fabricating conditions. The formability and strength of the stainless steel sheet is achieved by the combination of desulfuring and deoxidizing with Al for modification of inclusions to fine Al_2O_3 or $Al_2O_3 \cdot MgO$ particles sized 10 μm or less with an index of cleanliness of 0.06% or less and by cold-rolling for formation of the work-hardened ferritic structure without requiring heat treatment.

Typically bending workability of a stainless steel sheet obtained by work-hardening is generally worsened, however, the present invention teaches a work-hardened stainless steel sheet comprising a chemical composition consisting of specifically claimed components and a specific work-hardened ferritic structure. According to such features, strength and bendability of the work-hardened stainless steel sheet of the present invention is improved. Bendability of the steel sheet depends on the type and distribution of inclusions in the steel sheet, as described in the present specification. Accordingly, in order to improve bendability of the steel sheet, it is necessary to inhibit inclusions such as MnS, $MnO \cdot SiO_2$ and $MnO \cdot SiO_2 \cdot MnS$, which worsen bendability, and distribute inclusions such as Al_2O_3 and $Al_2O_3 \cdot MgO$ with an index of cleanliness of 0.06% or less. The combination of the claimed features improves the strength and bending workability of the work-hardened stainless steel.

Claims 4-7 are rejected under 35 U.S.C. §103(a) as being obvious over the previously cited teachings of Japanese Patent 402270942 (hereinafter referred to as "JP '942").

The Examiner asserts that the English abstract of JP '942 teaches a ferritic stainless steel alloy having a composition with constituents "whose wt% ranges overlap" those recited by the claims of the present invention. Claims 4 and 6 have now been amended to recite that the stainless steel composition contains 10-12.6 mass% of Cr to distinguish the present invention over the teachings of JP '942, which shows a Cr content of 14-26%. Accordingly, *JP '942 does not teach a composition with constituents whose wt% ranges overlap those recited by the claims* and, in fact, teaches a composition having a Cr content range which is greater than the

present invention.

The Examiner asserts that to lower Cr to improve processability yet reduce corrosion resistance would be a matter of routine optimization of an alloying constituent to achieve the desired balancing of properties which is well within the skill of the artisan and productive of no new and unexpected results. The Examiner bases this statement on the teaching of JP '942 that Cr at 14% is indispensable for improving corrosion resistance but also recognized that high Cr can deteriorate processability, then it would be obvious to lower Cr below the disclosed minimum of 14% to achieve better processability. The Examiner references page 16 of JP '942. It is unclear if the Examiner is referring to the actual JP '942 document or an English language translation thereof. If a translation of JP '942 is available, then the Examiner is requested to provide this translation to Applicants' representative.

Applicants respectfully traverse the Examiner's position for the following reasons. JP '942 is directed to a high-purity and high-cleanliness stainless steel and describes that oxide-type and sulfide-type inclusions are reduced by lowering the S content and adding specific amounts of Al or Ti. However, JP '942 does not recognize that ***bendability*** of the steel sheet depends on the type and distribution of these inclusions.

Further, Applicants respectfully traverse the Examiner's assertion that lowering the Cr content in order to improve bendability of the steel can be easily conceived by a person skilled in the art because JP '942 recognizes that high Cr content can deteriorate ***processability***. **Bendability and processability are not synonymous terms**. In general, since a steel sheet having a lower Cr content becomes softer, ***processability*** of the steel sheet can be improved. However, ***bendability*** indicates whether cracks are generated upon bending the steel sheet. This ***bendability*** substantially differs from ***processability*** depending on strength of the steel sheet. In other words, ***bendability*** does not depend on the softness of the steel sheet, but depends on the type and distribution of inclusions in the steel sheet.

In the steel sheet having the composition of the presently claimed invention, having the lower Cr content, such improved strength can be obtained by work-hardening the steel sheet, and improved bendability can be obtained by controlling the type and distribution of inclusions in the steel sheet as claimed. Accordingly, since JP '942 does not recognize the specific problems of the present invention, which is to improve strength and bendability of a

steel sheet having the lower Cr content of 10-12.6 mass%, but rather **specifically teaches a higher Cr content of 14-26%**, one having ordinary skill in the art would **not** be motivated to reduce this Cr content through "routine optimization" as suggested by the Examiner.

When JP '942 teaches only high Cr content (14-26%) to achieve desired properties (including corrosion resistance), there is no rationale to reduce the amount of Cr to a level below the minimum amount (14%).

For the reasons set forth above, it is respectfully requested that the rejection of claims 4-7 under 35 U.S.C. §103(a) be withdrawn as JP '942 fails to render these claims obvious.

Claims 4-7 are also rejected under 35 U.S.C. §103(a) as being obvious over the computer generated English translation of the newly cited Japanese Patent 2001-254153 (hereinafter referred to as "JP '153").

The Examiner asserts that in JP '153 claims 1-3 disclose a ferritic stainless steel alloy having a composition with constituents whose wt% ranges overlap those recited by the claims and that such overlap establishes a *prima facie* case of obviousness since it would be obvious for one skilled in the art to select the claimed alloy wt% ranges over the broader disclosure of the prior art because the prior art teaches similar properties such as high workability.

Applicants respectfully traverse the Examiner's rejection for the following reasons.

Claim 4 is directed to a **work-hardened stainless steel sheet** comprising a chemical composition **consisting of** 0.15 mass% or less of C, 1.0 mass% or less of Si, 1.0 mass% or less of Mn, 0.005 mass% or less of S, 10-12.6 mass% of Cr, 0.5 mass% or less of Ni, 0.001-0.05 mass% of Al and the balance being Fe except inevitable impurities; and a work-hardened ferritic structure, wherein at least one of Al_2O_3 and Al_2O_3 MgO inclusions of 10 μm or less in size are distributed with an index of cleanliness of 0.06% or less.

Claim 6 is also directed to a **work-hardened stainless steel sheet** comprising a chemical composition **consisting of** the composition of claim 4 with the addition of at least one of 0.5-2.0 mass% of Mo, 0.5-3.0 mass% of Cu and 0.05-1.0 mass% of Nb.

JP '153 is concerned with a materially different product than the present invention. JP '153 is directed to an annealed stainless steel sheet, not a work-hardened stainless steel sheet, as specifically recited in the claims.

JP '153 is concerned with an annealed stainless steel sheet which has a materially different chemical composition than the composition recited in the claims.

JP '153 recites a composition that includes constituents that are excluded from the "consisting of" language of the claims. Specifically, JP '153 describes using elements in addition to those specified in claims 4 and 6, namely, at least P, N, and Ti. While it would seem that P is optional as it only has an upper limit claimed, such cannot be said for Ti and N. Paragraph [0017] of JP '153 states that Ti is an important element in the composition as it raises the weldability of the steel. Thus, Ti cannot be considered an "optional" ingredient as suggested by the Examiner. With respect to N, the Examiner asserts that JP '153 teaches a lower limit of 0.0005%, which would be equivalent to an inevitable impurity. Paragraph [0010] specifically teaches a **range of N that includes a lower limit which is greater than zero.** Thus, JP '153 recognizes the need of N as a constituent of the composition. The claims of the present invention comprise a composition **consisting of** specific constituents. These specific constituents do not include the additional constituents of P, N, and Ti, as taught by JP '153. Furthermore, JP '153 does not provide any motivation to one having ordinary skill in the art to exclude these constituents from the annealed stainless steel sheet disclosed therein.

For the reasons set forth above, it is respectfully requested that the rejection of claims 4-7 under 35 U.S.C. §103(a) be withdrawn as JP '153 fails to render these claims obvious.

CONCLUSION

In view of the comments set forth above, the application is deemed to be in condition for allowance. Accordingly, favorable consideration of the pending claims is respectfully requested.

Should the Examiner have any questions regarding this information, the Examiner is invited to contact Applicants' undersigned representative by telephone at 412-471-8815.

Respectfully submitted,

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